

Integrated Photonic Filters for RF Signal Processing, Phase I

Completed Technology Project (2018 - 2019)



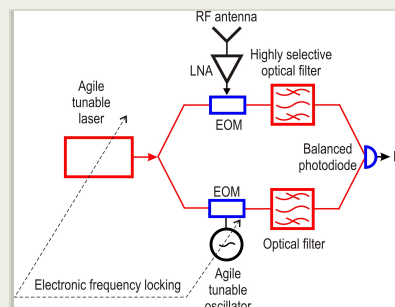
Project Introduction

In this Project, OEwaves Inc. and Georgia Tech team propose to research and develop a unique RF photonic receiver front-end enabling microwave signal processing at a heterogeneously integrated photonic platform. In particular, we propose to develop a new technology for photonic microwave filters based on the new advances in Si-based integrated photonics. We will exploit the expertise of the team members who have made extensive contributions to silicon (Si) and silicon nitride (SiN) integrated photonic structures (Georgia Tech) and the design and development of analog photonic systems (OEwaves Inc.).

Anticipated Benefits

These photonic integrated circuits permit size, weight, power and cost reductions for spacecraft microprocessors, communication buses, processor buses, advanced data processing, free space communications and integrated optic science instrument optical systems, subsystems and components. Allowing NASA to respond to the steady increase in data rates, with signal coding and modulation for more efficient use of the RF spectrum establishing reliable radio links across thousands of miles of space.

Various military airborne intelligence, surveillance, and reconnaissance (ISR) as well as government software defined and cognitive radio applications had demonstrated great need for such a tunable microwave-photonic filter. Customers include the federal government (DoD, NSA, etc.), government/defense contractors (Lockheed Martin, BAE Systems, L-3, Northrop Grumman, UTC Aerospace, etc.), and government communication radio developers (Motorola Solutions, Harris, National Instruments, etc.).



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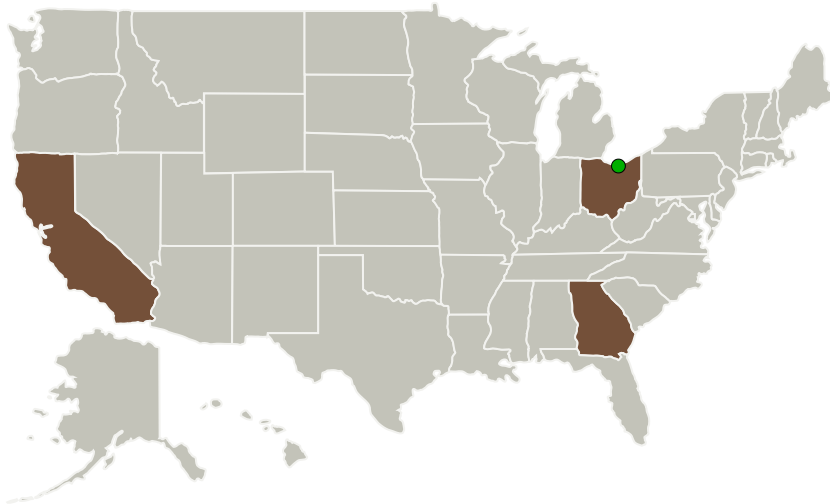
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
OEwaves, Inc.	Lead Organization	Industry	Pasadena, California
Georgia Institute of Technology - School of Electrical and Computer Engineering	Supporting Organization	Academia	Atlanta, Georgia
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
California	Georgia
Ohio	

Project Transitions

July 2018: Project Start

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

OEwaves, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

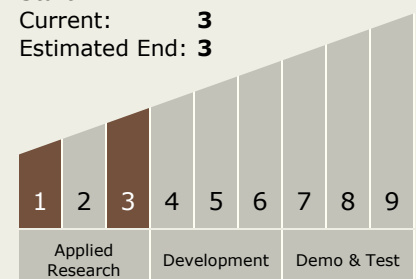
Carlos Torrez

Principal Investigator:

Andrey Matsko

Technology Maturity (TRL)

Start: **1**
 Current: **3**
 Estimated End: **3**



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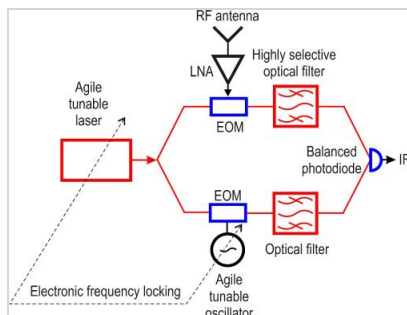


✓ **August 2019:** Closed out

Closeout Documentation:

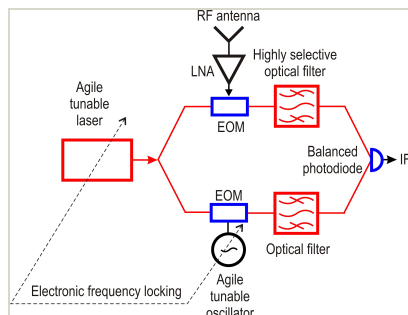
- Final Summary Chart(<https://techport.nasa.gov/file/137841>)

Images



Briefing Chart Image

Integrated Photonic Filters for RF Signal Processing, Phase I
(<https://techport.nasa.gov/image/131567>)



Final Summary Chart Image

Integrated Photonic Filters for RF Signal Processing, Phase I
(<https://techport.nasa.gov/image/130679>)

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - TX05.1 Optical Communications
 - TX05.1.6 Optometrics

Target Destinations

The Moon, Earth